*Transactions of the Royal Society of S. Aust.* (1996), **120**(2), 71-73.

BRIEF COMMUNICATION

# THE TADPOLE OF *LITORIA REVELATA* INGRAM, CORBEN AND HOSMER, 1982 (ANURA: HYLIDAE).

*Litoria revelata* Ingram, Corben & Hosmer, 1982 is a medium sized tree-frog that has three disjunct populations; in northern Queensland (Atherton Tableland and the Bellenden-Ker Range), mid-eastern Queensland (Eungella Plateau) and the extreme corner of south eastern Queensland and northern NSW, Australia[1]. Herein we present a description of the tadpole of *L. revelata* from the rainforest in the Eungella region in mid-eastern Queensland. Habitat and life history notes are presented to assist identification in the field but these are intended as a guide only and tadpoles could be found in different habitats and months from those given.

Tadpoles were collected in November and December of 1993 at several stream sites near the Eungella township, approximately 70 km west of Mackay, central Queensland, Australia (Table 1). A sample of larvae was preserved in 10% formalin and others were reared to metamorphosis for identification. Terminology follows Altig[2] and Hero[3]; developmental stages follow Gosner[4]. Measurements were taken using vernier callipers. Height of the caudal muscles and fins was measured at mid-length of the tail. The drawings depict melanic patterns that persist in preserved specimens (10% formalin). The colour descriptions should be treated with caution as tadpole colour is often a function of water clarity[5]. Drawings were made of two representative specimens (Figs 1 and 2) placed in the Queensland Museum, Brisbane (QM J 59239 and J 59240). The labial tooth-row formula (LTRF) is based on observations of all specimens collected at Gosner[4] stages 25 through 45 (QM J 59241 and J 59242; Table 1).

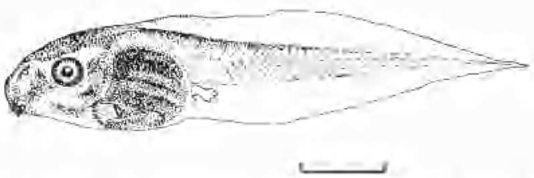

Fig. 1. Tadpole of *Litoria revelata* (QM J 59240; Gosner stage 35; TL 31.5 mm). Scale bar = 5 mm.

*Description*: Eyes lateral; eye diameter 14.5% of the body length for stage 35 tadpoles and 14.7% for stage 40 tadpoles. Nares dorsal, nearer to tip of snout than to anterior edge of eye; narial margin without rim; spiracle paragyrinid (Fig. 2 C: located well below the horizontal longitudinal axis but not on the midline so neither sinistral nor medioventral is entirely applicable[6]), unpigmented, opening directed posteriorly.

Vent tube dextral, attached to fin. Oral disc ventral. Single row of large blunt, heavily pigmented marginal papillae with wide anterior gap. Submarginal papillae present. Two rows of labial teeth on anterior labium with median gap in second row; three rows of labial teeth on posterior labium with median gap in first row: LTRF 2(2)/3 (1). Dorsal fin terminates at tail-body junction. Both dorsal and ventral fins higher than caudal musculature at midlength of tail. Tail-tip tapers uniformly to narrow point. These morphological features conform to the general characteristics for tadpoles of the genus *Litoria*.

In life, body opaque, appearing "bluish" and heavily pigmented with lighter pigmentation around eyes; darkly pigmented supracranial patch (especially in larger tadpoles) extending posteriorly over spinal cord (Fig. 2B); distinct broad

TABLE 1. *Dates, Localities and Museum Numbers for additional specimens examined in this study: Mt William (upper Cattle Cr.; Map 8655, MGR 666740), Mt David (upper Cattle Cr.; Map 8655, MGR 678744).*

| Date | Place Collected | Gosner Stage (No.) | Body Length (mean) | Total Length (mean) | Qd Mus. No. |
|---|---|---|---|---|---|
| 27.xi.93 | Cattle Cr. Mt William | 25 | 4.6-8.1 | 11.2-18.3 | J 59242 |
| | | (7) | (6.6) | (15.3) | |
| | | 26 | 9.5 | 23.2 | |
| | | 27 | 10.6 | 26.7 | |
| | | 28 | 8.4 | 21.5 | |
| | | 29 | 11.3 | 27.4 | |
| | | 31 | 12.0 | 29.8 | |
| | | 33 | 11.7 | 30.6 | |
| | | 36 | 12.4 | 31.2 | |
| | | 37 | 13.3 | 33.3 | |
| | | 42 | 11.1-12.0 | 29.6-35.1 | |
| | | (2) | (11.5) | (32.3) | |
| | | 43 | 10.5 | - | |
| | | 44 | 11.4-13.4 | - | |
| | | (5) | (12.3) | | |
| 29.xi.93 | Cattle Cr. Mt David | 25 | 8.8-10.6 | 21.1-25.2 | J 59241 |
| | | (3) | (9.7) | (23.1) | |
| | | 27 | 11.4-11.9 | 26.1-27.6 | |
| | | (2) | (11.6) | (26.8) | |
| | | 31 | 12.0 | 33.0 | |
| | | 37 | 14.6 | 43.1 | |
| | | 41 | 14.4 | 40.8 | |

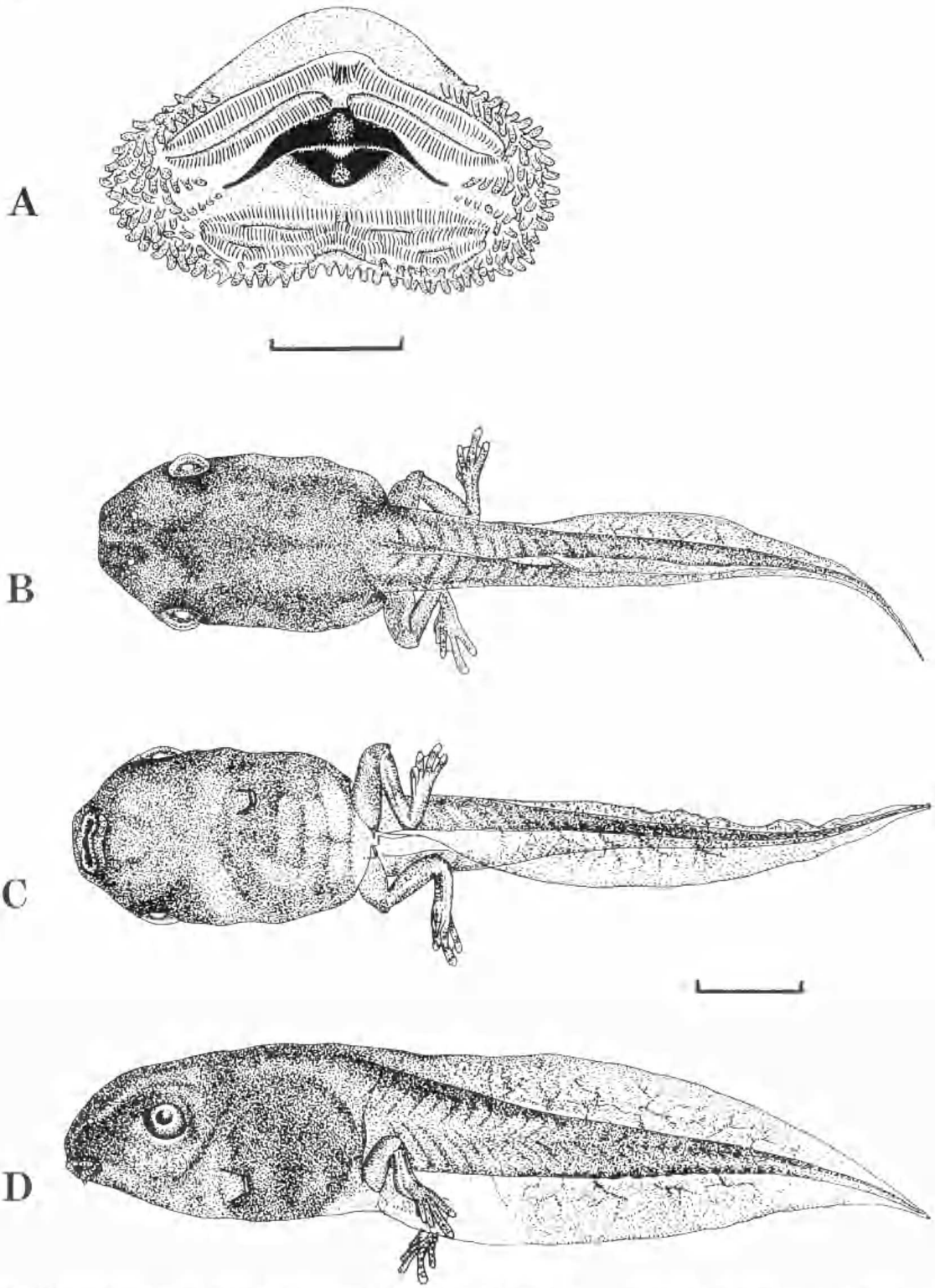


Fig. 2. Tadpole of *Litoria revelata* (QM J 59239; Gosner Stage 40; TL 40.8 mm). A. Oral disc. B. Dorsal view. C. Ventral view. D. Dorso-lateral view. Scale bars = 1 mm (A), 5 mm (B,C,D).

vertical subdermal lines on dorsal side of each naris. Horizontal band or patch from snout to eye (Fig. 2D). Pigmentation often lighter during earlier stages (Fig. 1) than at later stages (Fig. 2B-D). In ventral view intestinal mass visible, intestinal coils partially visible and obscured by heavy pigmentation; branchial region semi-transparent. Tail musculature an even shade of grey/brown with additional melanophores concentrated dorsally (Fig. 2D). Dorsal and ventral fins transparent, with even stippling of dark melanophores, often outlining venation.

A tadpole at Stage 35 (Fig. 1) had the following measurements (mm): total length 31.5, body length 11.7, body width 6.5, body height 6.0, tail height 7.2, interorbital distance 5.6, internarial distance 2.1, eye-naris distance 2.0. A tadpole at Stage 40 (Fig. 2) had the following measurements (mm): total length 40.8, body length 14.3, body width 8.2, body height 7.3, tail height 8.3, interorbital distance 6.2, internarial distance 2.0, eye-naris distance 2.6. Tadpoles vary in total length from 11.2 mm at Stage 25 to 43.1 mm at Stage 37 (Table 1).

*Diagnosis*: At the sites studied, live tadpoles of *L. revelata* can easily be confused with *L. chloris* as both species occur in mid-water sections of isolated streamside pools and they have similar body shape and oral disc formula. Live tadpoles of *L. revelata* have a bluish sheen covering the intestinal mass and the intestinal coil is partially visible (Fig. 2C). In contrast, *L. chloris* has a golden sheen covering the intestinal mass, the intestinal coils are visible mid-ventrally and golden chromatophores cover the heart.

In preservation, tadpoles of *L. revelata* have pigmentation covering the intestinal mass making the intestinal coils only partially visible. In contrast, *L. chloris* has a transparent ventral surface and the intestinal coils are clearly visible. The position of the spiracle, paragyrinid in *L. revelata* and sinistral in *L. chloris* and the dark pigmentation on the oral papillae of *L. revelata* (with only few scattered pigments on the oral papillae of *L. chloris*) also distinguish these two species. Interestingly, we only know of one other *Litoria* sp. in Australia with a paragyrinid spiracle (*L. rubella*, unpubl.). Tadpoles of *L. revelata* were found in sympatry with tadpoles of *L. chloris* and *Taudactylus liemi*. Adult frogs of *T. eungellensis* and *Mixophyes fasciolatus* were also observed in adjacent streams.

*Habitat*: Tadpoles of *L. revelata* were found in isolated bedrock pools adjacent to fast-flowing rocky streams surrounded by pristine rainforest. Each pool contained leaf litter and algae and was between 1.5 and 2.5 m from the stream. No fish were observed or captured by dip netting the pools. Water temperatures were noticeably higher in the pools than in the adjacent stream (Table 2). Pool dimensions in November were 100 cm x 50 cm x 10 cm deep for pool 1 and 200 cm x 100 cm x 25 cm deep for pool 2. Tadpoles were generally observed in the midwater and surface water rather than the benthic layer of the water column and were frequently observed rising to the surface to gulp air.

TABLE 2. *Water temperatures (°C) of pools and the adjacent stream at two sites.*

| Site | Date | Pool 1 | Pool 2 | Adjacent Stream |
|---|---|---|---|---|
| Cattle Cr. Mt William | 18.ix.94 | 14.9 | 16.0 | 14.2 |
| | 16.x.94 | 16.8 | 17.2 | 15.2 |
| | 13.xi.94 | 19.7 | 20.5 | 17.9 |
| | 11.xii.94 | 20.0 | 19.6 | 18.0 |
| Cattle Cr. Mt David | 19.ix.94 | 17.5 | 16.0 | 13.5 |
| | 17.x.94 | 21.3 | - | 15.0 |
| | 14.xi.94 | 20.0 | - | 17.0 |
| | 12.xii.94 | 22.5 | 22.8 | 17.9 |

This research was partially funded by the Australian Nature Conservation Agency, the Queensland Department of Environment and Heritage, the Wet Tropics Management Authority and the Cooperative Research Centre for Tropical Rainforest Ecology and Management. Research was carried out under a Qld Dept of Environment and Heritage "Permit to Take" no. T00177. We wish to thank Michael Cunningham for his contribution to this paper and Julie Martin who prepared the illustrations and the volunteers who assisted in the J.C.U. Eungella Frog Search in November/December, 1993. Ross Alford provided logistical support at J.C.U. and Marion Anstis gave valuable comments on a draft.

[1]**Ingram, G. J., Corben C. J. & Hosmer, W.** (1982) Mem. Qd Mus. **20**, 635-637.
[2]**Altig, R.** (1970) Herpetologica **26**, 180-207.
[3]**Hero, J.-M.** (1990) Amazoniana **11**, 201-262.
[4]**Gosner, K. L.** (1960) Herpetologica **16**, 183-190.
[5]**Bragg, A. N.** (1957) Copeia **1957**, 36-39.
[6]**Johnston, G. F. & Altig, R.** (1986) Herp. Rev. **17**, 36-37.

JEAN-MARC HERO Wet Tropics Management Authority CRC Tropical Rainforest Ecology and Management Dept of Zoology James Cook University Townsville, Qld 4811, SHEREE FICKLING & RICHARD RETALLICK Dept of Zoology James Cook University Townsville, Qld 4811.